



Clayton Cleaners Site **550 North and South Road, St. Louis, Missouri** **St. Louis County**

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Site Description

The Clayton Cleaners site has been an active dry cleaning business since 1938, with the exception of 1953 to 1968 when a beauty salon occupied the building. Clayton Cleaners has been in operation at the site since 1988. Tetrachloroethene (PCE) was used during dry cleaning operations until April 2012, resulting in contaminated soil and groundwater at the site and surrounding area.

Environmental contractor Shifrin & Associates conducted the earliest environmental site investigations in 1997, documenting PCE-contaminated soil. From 2004 to 2017, the current site owner, 550 North and South L.L.C., conducted site characterization work as part of the Missouri Department of Natural Resources' Voluntary Cleanup Program (VCP) and Drycleaning Environmental Response Trust (DERT) Fund Program. However, this work was not completed before the DERT Program expired in 2017. At that time, the VCP referred the site to the department's Superfund Section for further investigation.

Description of Contaminant

PCE is a nonflammable, colorless liquid that is also known as tetrachloroethylene, tetrachloroethene, perchloroethene, perchlor or perc. PCE is a volatile organic compound (VOC), which means it evaporates readily into the air. PCE is commonly used as a dry cleaning agent or as a metal-degreasing solvent. PCE does not occur naturally in the environment; however, due to its widespread past use in the dry cleaning and manufacturing industry, it is a common chemical present at sites where there is environmental contamination.

PCE released to surface water or surface soil tends to evaporate quickly, but breaks down very slowly in groundwater and can persist for a long time. PCE and other VOCs may migrate from contaminated groundwater and soil into air spaces beneath buildings and enter the indoor air, a process called vapor intrusion. A variety of factors influence whether vapor intrusion occurs at a building located near a source of soil or groundwater contamination. These factors include soil type, depth to groundwater, building construction, the foundation's condition and existence of underground utilities that can serve as pathways for vapors to travel.

It is not known exactly how long PCE has been used at the Clayton Cleaners site, but its use was discontinued there in April 2012. Site records do not indicate how PCE was stored on the site during operation; however, no underground storage tanks were registered with the department, nor was there any evidence of tanks on the property. While the exact nature of the on-site PCE release is unknown, it is not uncommon for dry cleaning machinery or piping to leak, or for product to be released to the subsurface from spills via floor drains.

Previous Investigations & Site History

In November 1997, at the request of Mercantile Trust Company, Shifrin & Associates completed a phase I & II environmental site assessment (ESA) to determine if hazardous substances were present, which would indicate a release at the site. During the investigation, three soil samples were collected. The results showed PCE in a soil boring on the building's northwest corner at 1,300 milligrams per kilogram (mg/kg) or parts per million (ppm) at a depth of 16 feet below ground surface.

In November 2004, environmental contractor Riverfront Environmental Incorporated completed an additional phase II subsurface investigation at the site at the request of Thompson Coburn L.L.C. This investigation further documented PCE and breakdown VOCs in soil and groundwater above cleanup levels. Further investigation to delineate the extent of contamination was recommended.

In April 2005, the new property owner, 550 North and South L.L.C., entered the VCP to conduct additional investigation. In July 2005, Riverfront Environmental completed a phase II site characterization. This investigation documented additional PCE contamination in soil and groundwater from 16 soil borings and groundwater monitoring wells from a former service station property located north of the dry cleaning site. PCE was detected in groundwater monitoring wells on the former service station property at levels up to 73,700 micrograms per liter ($\mu\text{g/L}$) or parts per billion (ppb), and in groundwater on the dry cleaner site at 203,000 $\mu\text{g/L}$.

As part of the work under the VCP and under department oversight, Riverfront Environmental installed eight groundwater monitoring wells in September 2005 and began quarterly monitoring. In June 2006, the Clayton Cleaners site applied for and was accepted into the DERT Fund Program. Established by Senate Bill 577 in 2000, the DERT Fund provided funds to investigate and remediate chlorinated solvent contamination from dry cleaning facilities. Operators of active dry cleaners were required to register with the department and pay an annual registration surcharge based on the number of gallons of chlorinated solvents used in a calendar year. As of May 2006, the DERT Fund was still active and adequate funding was available.

Using DERT funds, Riverfront Environmental continued groundwater monitoring at the site from 2006 to 2011, when Shifrin & Associates took over as the site's environmental consultant. Groundwater monitoring results documented PCE and trichloroethylene (TCE) at levels ranging from 2.0 to 169,000 $\mu\text{g/L}$ and 2.4 to 23,400 $\mu\text{g/L}$, respectively. In 2010, Riverfront Environmental collected soil gas samples from two on-site locations. PCE was detected at 220,000 $\mu\text{g/m}^3$ from a soil gas probe on the facility's southern side.

The highest PCE concentrations in soil and groundwater were located on the building's northwest corner. The last round of groundwater sampling was conducted in 2012, when the most heavily impacted groundwater was found in wells surrounding the building's footprint, particularly on the west side. The final site characterization report, completed in April 2012, indicated that a cleanup plan would be submitted to the department. In September 2012, the department notified Clayton Cleaners that DERT funding would be limited for future costs; no additional investigation was conducted from 2012 to 2017, due to the limited funding.

The maximum contaminant level (MCL) for PCE in drinking water is 5 ppb. MCLs are standards set by EPA to protect public health by limiting the levels of contaminants in public drinking water supplies. Missouri American Water supplies drinking water in the site area; there have been no detections of PCE in this system.

The primary exposure concern at the Clayton Cleaners site is vapor intrusion. Vapor intrusion is an evolving field of science that many years ago was not considered an exposure pathway. For years, only direct-contact exposures, such as the drinking water pathway, were addressed; however, many sites are now being re-evaluated for potential vapor intrusion risk. It was not until 2015 that EPA finalized its guidance on investigating and evaluating vapor intrusion. The groundwater and soil gas levels previously documented at the Clayton Cleaners site exceed EPA's current vapor intrusion screening levels, indicating the need for additional sampling to evaluate the risk of vapor intrusion into the facility and nearby buildings.

Because the vapor intrusion risk at the Clayton Cleaners site had not been fully evaluated, the department's VCP referred the site for further investigation to the Superfund Section in 2018, after the DERT Fund Program expired. As authorized under the federal Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), and the Superfund Amendments and Reauthorization Act of 1986, the department completed a pre-CERCLA screening and abbreviated preliminary assessment of the Clayton Cleaners site in May 2019, recommending to EPA that a site inspection be conducted. The site inspection investigation results are summarized below.

Site Inspection Investigation

In September 2019, the department conducted CERCLA site inspection sampling to determine current PCE concentrations in on-site soil gas and groundwater, and whether PCE had migrated off the dry cleaning facility property. The department collected a total of six groundwater samples, six soil gas samples, five sub-slab vapor samples, and three sewer gas samples from the Clayton Cleaners property and surrounding residential properties.

Based on investigation results, the primary concern remains the potential for exposure of nearby building occupants to PCE and breakdown products through the vapor intrusion pathway. Concentrations of PCE and breakdown products in groundwater, soil gas, sewer gas, and sub-slab vapor were documented at levels above EPA's commercial and residential vapor intrusion screening levels, warranting further investigation. It should be noted that, although this sampling documents a potential for vapor intrusion, these results do not mean any exposure is actually occurring, but that further investigation is needed.

Sampling results confirmed that a PCE groundwater plume is present beneath the Clayton Cleaners facility and that contamination has traveled west, following the direction of groundwater flow. In addition, contaminants appear to have migrated north via the sewer system. The highest contaminant concentrations were found at the Clayton Cleaners property and properties west and south of the dry cleaner.

Based on site investigation results, the department recommends additional characterization at the Clayton Cleaners site to fully define the extent of PCE and breakdown product contamination. Indoor air sampling is needed to determine whether any exposure is occurring in residential or commercial structures where nearby contaminant levels in soil gas, sub-slab vapor, or sewer gas exceed EPA vapor intrusion screening levels.

As part of the Superfund Cooperative Program, a letter of agreement (LOA) was signed between the department and the current property owner on Dec. 22, 2021, with an effective date of Jan. 1, 2022. The LOA lays out the details for the property owner to conduct further site characterization and to initiate any actions necessary to address exposure risk above a level of health concern. Further investigations by the property owner are expected to commence by summer or fall 2022.

For More Information

For additional information regarding the site, contact Pia Capell, Missouri Department of Natural Resources, at pia.capell@dnr.mo.gov or 573-751-2115.

Aerial Map

